RETENTION FACILITY CALCULATIONS - by BASIN — 100 Year, 24 Hour Storm Calculations

CONDITION	BASIN	STORM RETURN PERIOD	TREATMENT TYPE	TREATMENT AREA	EXCESS PRECIPITATION	PEAK RUNOFF	RUNOFF VOLUME	RUNOFF RATE
					(table 4)	(table 8)	(table 9)	
-		year	-	sq. ft.	in.	cfs/acre	cu. ft.	cfs
DEVELOPED	A 1	100	A	0	0.44	1.29	0	0.00
			B	603	0.67	2.03	34	0.03
			C	0	0.99	2.87	0	0.00
			D	1262	2.43	4.37	256	0.13
			TOTAL	1865			289	0.15
	A 2	100	A	0	0.44	1.29	0	0.00
			B	708	0.67	2.03	40	0.03
			C	0	0.99	2.87	0	0.00
			D	1186	2.43	4.37	240	0.12
			TOTAL	1894			280	0.15
	A 3	100	A	0	0.44	1.29	0	0.00
			B	0	0.67	2.03	0	0.00
			C	0	0.99	2.87	0	0.00
			D	798	2.43	4.37	162	0.08
			TOTAL	798			162	0.08
	B 1	100	A	0	0.44	1.29	0	0.00
			B	283	0.67	2.03	16	0.01
			C	0	0.99	2.87	0	0.00
			D	718	2.43	4.37	145	0.07
			TOTAL	1001			161	0.09
	B 2	100	A	0	0.44	1.29	0	0.00
			B	307	0.67	2.03	17	0.01
			C	0	0.99	2.87	0	0.00
			D	1034	2.43	4.37	209	0.10
			TOTAL	1341			227	0.12
	B 3	100	A	0	0.44	1.29	0	0.00
			B	416	0.67	2.03	23	0.02
			C	0	0.99	2.87	0	0.00
			D	3032	2.43	4.37	614	0.30
			TOTAL	3448			637	0.32
	C 1	100	A	0	0.44	1.29	0	0.00
			B	0	0.67	2.03	0	0.00
			C	342	0.99	2.87	28	0.02
			D	990	2.43	4.37	200	0.10
			TOTAL	1332			229	0.12
	C 2	100	A	0	0.44	1.29	0	0.00
			B	201	0.67	2.03	11	0.01
			C	0	0.99	2.87	0	0.00
			D	718	2.43	4.37	145	0.07
			TOTAL	919			157	0.08
	D	100	A	0	0.44	1.29	0	0.00
			B	3292	0.67	2.03	184	0.15
			C	0	0.99	2.87	0	0.00
			D	1901	2.43	4.37	385	0.19
			TOTAL	5193			569	0.34
	E	100	A	386	0.44	1.29	14	0.01
			B	716	0.67	2.03	40	0.03
			C	0	0.99	2.87	0	0.00
			D	0	2.43	4.37	0	0.00
			TOTAL	1102			54	0.04
	F	100	POOL	662	2.66	0.00	147	0.00
TOTAL				19555			2910	1.51

STORM DRAIN SYSTEM CALCULATIONS

AREA DRAIN AND CATCH BASIN GRATES
ASSUME GRATE: has a 50% opening to area ratio, a Factor of Safety of 2 for clogging at Area Drains and 1.5 for Catch Basins and that grates function as an orifice where
$Q = CA(2gH)*0.5$, $C = 0.60$ & $g = 32.2$ ft/sec/sec.

BASIN A-1
$Q = 0.15$ cfs (from table at left), $H = 0.25$ ft, 2 grates
Therefore $A = 0.0187$ sq.ft., $R = 0.14$ ft., USE 6 in. Grate

BASIN A-2
$Q = 0.15$ cfs (from table at left)
Use grate from Basin B-3 which has a $Q = 0.32$ cfs

BASIN A-3
$Q = 0.05$ cfs (from table at left), $H = 0.08$ ft,
Therefore $A = 0.0367$ sq.ft., $R = 0.15$ ft. USE 6 in. Grate

BASIN B-1
$Q = 0.09$ cfs (from table at left) and $H = 0.30'$
Use grate from Basin B-2 which has a $Q = 0.12$ cfs

BASIN B-2
$Q = 0.12$ cfs (from table at left) and $H = 0.30'$
Therefore $A = 0.0498$ sq.ft., $R = 0.17$ ft. USE 6 in Grate

BASIN B-3
$Q = 0.32$ cfs (from table at left) and $H = .25'$
Therefore $A = 0.1329$ sq.ft., USE 24x24 in. Grate
to provide maintenance access.

PIPES
TO ASSURE CONSERVATIVE RESULTS: assume all pipe runs start as an orifice where $Q = CA(2gH)*0.5$, $C = 0.60$ & $g = 32.2$ ft/sec/sec., min. pipe cover is 2 ft. & the min. grade is 0.01 ft/ft., 6" pipe area = 0.1963 s.f., 6in. full pipe capacity @ 0.01ft/ft = 0.56cfs

BASIN A-1
$Q = 0.15$cfs (from table at left) and $H = 2.25'$
Therefore $A = 0.0208$ sq.ft., USE 6 in. Diam. PVC pipe

BASIN A-2
$Q = 0.30$cfs (from table at left) and $H = 2.25'$
Therefore $A = 0.0415$ sq.ft., USE 6 in. Diam. PVC pipe

BASIN A-3
$Q = 0.38$cfs (from table at left) and $H = 2.85'$
Therefore $A = 0.0467$ sq.ft., USE 6 in. Diam. PVC pipe

BASIN B-1
$Q = 0.09$cfs (from table at left) and $H = 2.25'$
USE pipe from Basin A-1 which has a $Q = 0.15$cfs

BASIN B-2
$Q = 0.21$cfs (from table at left) and $H = 2.25'$
USE pipe from Basin A-2 which has a $Q = 0.30$cfs

BASIN B-3 at catch basin
$Q = 0.32$cfs (from table at left) and $H = 1.25'$
Therefore $A = 0.0594$ sq.ft., USE 6 in. Diam. PVC pipe

BASIN B-3 at outlet pipe combining Basins B-1, 2 & 3
$Q = 0.53$cfs (from table at left) and $H = 3.15'$
Therefore $A = 0.0620$ sq.ft., USE 6 in. Diam. PVC pipe

DRAINAGE CALCULATIONS - SITE — 100 Year, 6 Hour Storm Calculations

NOTE THAT THE POOL IS REMOVED FROM THE DEVELOPED BASIN AREA.
SEE THE RETENTION CALCULATIONS FOR 24 HOUR STORM RUNOFF.

CONDITION	BASIN	STORM RETURN PERIOD	TREATMENT TYPE	TREATMENT AREA	EXCESS PRECIPITATION	PEAK RUNOFF	RUNOFF VOLUME	RUNOFF RATE
					(table 4)	(table 8)	(table 9)	
-	-	year	-	sq. ft.	in.	cfs/acre	cu. ft.	cfs
EXISTING	SITE	10	A	15817	0.08	0.24	105	0.09
			B	3738	0.22	0.76	69	0.07
			C	0	0.44	1.49	0	0.00
			D	0	1.24	2.89	0	0.00
			TOTAL	19555			174	0.15
		100	A	15817	0.44	1.29	580	0.47
			B	3738	0.67	2.03	209	0.17
			C	0	0.99	2.87	0	0.00
			D	0	1.97	4.37	0	0.00
			TOTAL	19555			789	0.64
DEVELOPED	SITE	10	A	386	0.08	0.24	3	0.00
			B	6526	0.22	0.76	120	0.11
			C	342	0.44	1.49	13	0.01
			D	11639	1.24	2.89	1203	0.77
			TOTAL	18893			1337	0.90
		100	A	386	0.44	1.29	14	0.01
			B	6526	0.67	2.03	364	0.30
			C	342	0.99	2.87	28	0.02
			D	11639	1.97	4.37	1911	1.17
			TOTAL	18893			2317	1.51

DRAINAGE BASIN DATA

D BASIN DESIGNATION
B LAND TREATMENT TYPE
3292 TREATMENT TYPE AREA (S.F.)
— BASIN BOUNDARY
— TREATMENT TYPE BOUNDARY

RETENTION VOLUME CALC'S

VOLUME REQUIRED
2910 CUBIC FEET PER TABLE AT UPPER LEFT.

PONDING PROVIDED

SURFACE

BASIN C-1
$((86)(0.33)(0.5) + (248)(0.5))(0.5) = 69$ CF

BASIN C-2
$(205)(0.5)(0.5) = 51$ CF

BASIN D
$(1674+3085)(0.5)(0.7) = 1665$ CF

SUBSURFACE

BASIN D
$(188)(2)(4) \times 0.35 = 526$ CF

TOTAL PONDING

2311 CF

INFILTRATION TRENCH FLOW

SOIL CONDUCTIVITY PER LAB TEST
0.0133 cm/sec = 0.0004 ft./sec

INFILTRATION TRENCH SURFACE AREA
$133(4+4+2) = 1330$ SF

TRENCH PEAK DISCHARGE RATE & FLOW
$0.0004(1330) = 0.53$ CFS, OR 1915 CF/ HOUR

HEADER CURB

* ROUND TOP EDGES WITH 1/2" EDGING TOOL.

2-#4 REINFORCING STEEL BARS
PORTLAND CEMENT CURB
SUBGRADE PREPARATION (95% MODIFIED PROCTOR)
COMPACTED SUBGRADE (90% MODIFIED PROCTOR)
PAVING SURFACE (SEE PAVING SECTION)
FILL SLOPE (SEE GRADING PLAN)

NOTE:
PROVIDE CONTRACTION JOINTS AT 5 FEET ON CENTER AND EXPANSION JOINTS AT 50 FEET ON CENTER UNLESS OTHERWISE STATED ON SITE PLANS OR IF CURB ABUTS SIDEWALK; WHERE CURB JOINTS SHALL MATCH SIDEWALK JOINTS.

INFILTRATION TRENCH

MAGNETIC WARNING TAPE FULL LENGTH OF TRENCH
OVERLAP 1' MIN.
FINISH GRADE
6" PERFORATED PVC PIPE
SANDY SOIL
FILTER FABRIC (MIRAFI 140-N OR APPROVED EQUAL)
WASHED GRAVEL (UNIFORM SIZE, 2" MAX., 3/4" MIN.)

NOTES:
1. DO NOT USE CRUSHED GRAVEL
2. ALL FILTER FABRIC JOINTS SHALL BE LAPPED 9" MINIMUM. LAPS MUST BE TRANSVERSE TO THE TRENCH. ENDS OF TRENCH MUST BE ENCLOSED WITH LAPPED FILTER FABRIC.

WATER QUALITY CATCH BASIN

GRADE TO DRAIN TO BASIN
NO. 4 REBAR @ 8" O.C. EACH WAY
NO. 4 REBAR (BENT)
INLET PIPE PER PLAN
OUTLET PIPE PER PLAN
FLOW
90° BEND
TRAFFIC RATED, CAST IRON GRATE AND FRAME. ELEV. PER PLAN
2" DIAM. HOLE IN BASIN FLOOR & 1 CU. FT. OF 3/4" GRAVEL ENCLOSED IN FILTER FABRIC.

STONE SPLASH PAD

WIDTH SHOWN ON PLAN MINIMUM

	PERCENT BY VOL.	PERCENT BY VOL.
> 6"	0-5	
3"-6"	40-60	
1"-3"	10-30	
3/8"-1"	10-15	
< 3/8"	0-5	

GRAVEL (UNCRUSHED) PER CHART
FILTER FABRIC (MIRAFI 140-N OR APPROVED EQUAL)
FINISH GRADE OF ADJACENT EARTH

CONSTRUCTION NOTES:
BOTTOM AND BANK WIDTHS SHALL VARY TO SIMULATE A NATURAL STREAM. STONES GREATER THAN 6" SHALL BE LIMITED TO BANK AREA.